Virus Name: Prospect Hill	Abbreviation: PHV

Status
Probably not Arbovirus

Select Agent
No

SALS Level

SALS Basis

Other Information

Antigenic Group
Hantaan

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
MP-40

Accession Number

Original Date Submitted
5/31/1985

Family
Bunyaviridae

Genus
Hantavirus

Information From
P. W. Lee and R. Yanagihara

Address
Laboratory of Central Nervous System Studies, National Instituteof Neurological and Communicative Disorders and Stroke, Bidg.

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Pyung-Woo Lee, et al (1)

Isolated at Institute
Frederick, Maryland

Host Genus
Microtus pennsylvanicus (meadow vole)

Species

Host Age/Stage
Adult

Sex
Not Answered

Isolated From	Isolation Details
Organs/Tissues	**Lung**

Signs and Symptoms of Illness
None (subclinical infection)

Arthropod

Time Held Alive before Inoculation

Collection Method
Live caught (Sherman trap)

Collection Date
9/4/1982

Place Collected (Minimum of City, State, Country)
Prospect Hill, Frederick, Maryland, USA

Latitude
39° 25' N

Longitude
77° 21' W

Macrohabitat
Meadow

Microhabitat

Method of Storage until Inoculated
Kept alive until processed

Footnotes

Section III - Method of Isolation

Inoculation Date
9/27/1982

Animal (Details will be in Section 6)
Microtus, E6 (Vero)

Route Inoculated
Intramuscular

Reisolation
Yes

Other Reasons

Homologous Antibody Formation by Source Animal
Yes

Test(s) Used
Indirect IFA

Footnotes

Section IV - Virus Properties

Physicochemical
RNA, Single Strand

Pieces (number of genome segments)	Infectivity	Sedimentation Coefficients(s) (S)
Percentage wt, of Virion Protein	Lipid	Carbohydrate
Virion Polypeptides: Number	Details	
Non-virion Polypeptides: Number	Details	
Virion Density	Sedimentation Coefficients(s) (S)	
Nucleocapsid Density	Sedimentation Coefficients(s) (S)	

Stability of Infectivity (effects)

pH (infective range)
Stable at pH 7.4; inactivated at pH 3.0

Lipid Solvent (ether - % used to test) **20%**	After Treatment Titer **<1.0 dex**	Control Titer **4.5 dex**
Lipid Solvent (chloroform) **5%**	After Treatment Titer **<1.0 dex**	Control Titer **4.5 dex**
Lipid Solvent (deoxycholate) **0.2%**	After Treatment Titer **<1.0 dex**	Control Titer **4.5 dex**

Other (formalin, radiation)
Inactivated by ultraviolet irradiation and heat (56dC; 30 min.)

Virion Morphology

Shape	Dimensions	
Mean **102 nm**nm	Range **80-120 nm**nm	
Measurement Method **Ultrafiltration**	Surface Projections/Envelope	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Inclusion Bodies **None demonstrable**	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
yes, not t	**PEG conc. of E6 cell culture fluid**	
pH Range **5.8-7.2**	pH Optimum **5.8**	
Temperature Range	Temperature Optimum **Only RT tried**	

Remarks

Serologic Methods Recommended
IFA, ELISA, PRNT, immune adherence HA

Footnotes

Section V - Antigenic Relationship and Lack of Relationship to Other Viruses

Serological relationships between Prospect Hill virus, Hantaan (HTN) virus and nephropathia epidemica (NE) virus were investigated using the indirect immunofluorescent antibody (IFA) technique. Sera were tested simultaneously against all three antigens, prepared as virus-infected E6 cells. The resulting antibody profiles were sufficiently distinct to permit discrimination between these viruses by IFA. In addition:

1. Sera from four American mammalogists and sera from meadow voles trapped in the United States reacted to highest titer against Prospect Hill virus and 2- to 4-fold and 4- to 8-fold, respectively, less to NE and HTN viruses.
2. Sera from patients with classical, severe hemorrhagic fever with renal syndrome (HFRS) in Korea, Far Eastern USSR, and the People's Republic of China reacted to highest titer to HTN virus and 64- to 128-fold and 128- to 256-fold, respectively, lower to Prospect Hill virus and NE virus.
3. Sera from the majority of patients with HFRS in Scandinavia, European USSR (Tula and Bashkiria), Hungary, and Yugoslavia reacted to highest titer to NE virus and 2-fold and 4-fold, respectively, lower to Prospect Hill virus and HTN virus.
4. Six monoclonal antibodies produced to HTN virus were used to examine antigenic relationships by IFA between HTN, Prospect Hill and NE viruses. All six monoclonal antibodies reacted with HTN virus, but none reacted with Prospect Hill or NE viruses [2] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Lung (LV), blood (LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Intramuscular inoculation of seronegative, laboratory-bred suckling or weanling Microtus pennsylvanicus; E6 clone of Vero cells

Cell system (a)	Virus passage history (b)	Evidence of Infection							
		CPE			PLAQUES			Growth Without CPE	
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	+/- (g)	
E6 (CL)	None	10	2+	3.0*					
E6 (CL)	E6/P5	2-29	1+-4+	2.0-5.0					
E6 (CL)	E6/P11				10	5mm	7.2*		

* Expressed in dex

Section VII - Natural Host Range (Additional text can be added below table)

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Microtus pennsylvanicus	2/14	53 * /230 IFA	Pennsylvania; Alaska, USA
Microtus californicus		46/185 IFA	California, USA
Microtus montanus		0/15 IFA	
Microtus oeconomus		0/14 IFA	Alaska, USA
Microtus breweri		0/12 IFA	Massachusetts, USA
Microtus oregoni		0/2 IFA	California, USA
Peromyscus maniculatus		5/41 IFA	California; Minnesota, USA
Peromyscus truei		1/18 IFA	California, USA
Peromyscus leucopus		0/220 IFA	Maryland; Virginia Pennslyvania, USA
Peromyscus eremicus		0/17 IFA	California, USA
Peromyscus crinatus		0/17 IFA	
Peromyscus boylii		0/3 IFA	
Clethrionomys gapperi		0/11 IFA	Pennslyvania; Minnesota, USA
Clethrionomys rutilus		0/9 IFA	
Neotoma micropus		0/25 IFA	Texas, USA
Humans (mammalogists)		4/203 IFA,NT	U.S.A. (4)

* Serum samples having immunofluorescent antibody titers of >16 to Prospect Hill virus were considered presumptive evidence of previous infection.

Section VIII - Susceptibility to Experimental Infection (include viremia)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log10/ml
Balb/c mice (nb)	MP-40 strain, E6/P5	ic 0.01	Develop antibody (IFA)		
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)		ic			
Mice (wn)		ip			
Mice (wn)		im 0.1	Develop antibody (IFA)		
Nude mice (NIH:S)		im 0.1	No antibody or antigen		
Fischer rat (nb)		ic 0.01	Develop antibody (IFA)		
Fischer rat (wn)		im 0.3	Develop antibody (IFA)		
Syrian hamster (wn)		im 0.3	Develop antibody (IFA)		
Mongolian gerbil (wn)		im 0.3	Develop antibody (IFA)		
Meadow vole (nb)		ic 0.01	Specific antibody and antigen		
Meadow vole (wn)		im 0.3	in lung tissue 14 days pi		
Cynomolgus monkey		iv 10 ml	Viremia day 7, specific antibody; mild proteinuria		
Cynomologus monkeys		iv	mild, transient proteinuria and azotemia (5)		
Chimpanzee		iv	Mild, transient proteinuria and azotemia (5)		

Section IX - Experimental Arthropod Infection and Transmission

Arthropod species & virus source(a)	Method of Infection log10/ml (b)		Incubation period (c)		Transmision by bite (d)		Assay of arthropod, log10/ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System

Section X - Histopathology

Character of lesions (specify host)
No significant lesion found in naturally and experimentally infected meadow voles.

Inclusion Bodies — Intranuclear

Organs/Tissues Affected

Category of tropism

Section XI - Human Disease

In Nature	Residual	Death
Subclinical	Overt Disease	
Clinical Manifestations		
Number of Cases	Category (i.e. febrile illness, etc.)	

Section XII - Geographic Distribution

Known (Virus detected)
Maryland, USA

Suspected (Antibody only detected)
Alaska; California; Virginia, USA.

Section XIII - References

1. Lee, P.-W., et al. 1982. Lancet ii(8312):1405-1407.
2. Franko, M.C., et al. 1983. Proc. Nat. Acad. Sci. 80:4149-4153.
3. Tsai, T.F. Personal communication. 1984.
4. Yanigihara, R. et al. 1984. New England J. Med. 310:1325-1326".
5. Yanagihara, R. et al. 1988. Arch. virol. 101:125-130.

Remarks